

All Souls might readily do as much for learning in Oxford by her fellowships as she now does to prevent learning—as she now does to turn the attention of the ablest men towards what will pay in examinations, and to shut their ears to the still small voice of latent imagination and original power. If All Souls gave her two fellowships each year for evidence of research, the ablest of the men studying the subjects of her choice would demand of their teachers inspiration and guidance in the highest work. Where the ablest men lead others would soon follow, and the whole intellectual atmosphere would rapidly change.

All Souls unaided could do an immense deal to induce the other colleges to provide higher teaching, or, even better, to encourage their men to get help outside the college walls. As it is, she provides the strongest of all the forces which chain Oxford to that unhappy infatuation which has had so disastrous an effect on the imagination, the initiative, the resourcefulness of the nation.

The title of this article was chosen in the profound conviction that interests much wider and more important than those of Oxford and Cambridge are at stake. Our ancient universities have heavy responsibilities, extending far beyond their historic walls. Every new university and university college in the Empire draws its teachers from Oxford and Cambridge, and, for good or for evil, moulds the broad features of its intellectual life upon the pattern supplied by these ancient seats of learning.

In the supreme interests of the Empire, as well as of the university itself, we fully sympathise with the aims of those who desire to render Oxford a more efficient instrument of research and the highest and most stimulating teaching, but we have no right to claim their sympathy or support for our own views on university and collegiate life. It may well be that the onlooker sees weaknesses and obvious measures of reform hidden from those on the spot, or appearing to them as a far-off ideal impossible of realisation, at least in this generation. Speaking for those who watch from without, who admire and would preserve and strengthen the truly inspiring elements of the academic life at both our ancient universities, we would gladly see them subject to the following simple, but, as we believe, efficient measure of reform.

The whole of the teaching should be entirely under the control of the university, which in its boards already possesses at least the foundation of the necessary apparatus. The college fellowships should be given in part for university teaching combined with original work and in part for research alone, to be held only during the continuance of investigation. A career would thus be open for originality of a high order, and the ablest men would flock to our ancient seats of learning and render them indeed worthy of the name. Residence in homes of ancient learning would gain added inspiration when the greatest traditions of the past were renewed and maintained. Even with things as they

are, Oxford and Cambridge, though much injured by competitive examinations, have been far less injured than England in general; and this they owe to the residential system. Little thought of, perhaps neglected, by the builders, the head-stone of the educational edifice is here to be found. Where mind meets mind in the free intercourse of youth there springs from the contact some of that fire which, under our present system, is rarely to be obtained in any other way; and not only this, but many other priceless advantages in the battle of life are also conferred. To these influences we owe in large part all that is best in the English character, and so valuable are the qualities thus developed, or at least greatly strengthened, that we regard residential colleges as essential to the success and usefulness of the newer universities. The changes we have advocated in the older universities would only add to this beneficent system increased power for good by substituting for the barren pride of first classes and university prizes the enthusiasm for a society which nobly holds its own in those achievements which bring renown wherever the advancement of learning is held in honour—a sufficient answer to the contention that to deprive a college of teaching is to render it a boarding-house and nothing more. That the advancement of learning is the desire of those who have signed the memorial we do not doubt, however much they may disagree with the methods here suggested for the attainment of their ends. On our part we feel such confidence in the beneficent influence of the increase in efficiency for which they plead, that we should gladly see funds provided for the purpose.

In former centuries the highest learning was encouraged in this country by the munificence of "founders and benefactors"; and we are glad to know that one of the needs set forth in the accompanying statement has already been generously met, and even more than met, by the establishment of a department presided over by a Beit professor of colonial history. But the signs of the times do not encourage us to anticipate any very large or fruitful following of this fine example; and we see no prospect of carrying out the suggested scheme in anything like completeness, except by a re-arrangement of the revenues of the university and the colleges, or by the action of a Government which is convinced that the national well-being is imperilled, the national existence at stake.

THE SARCODINE FAUNA OF DEEP LAKES.

Les Sarcodinés des Grands Lacs. By Eugène Penard. Pp. 133. (Geneva: H. Kundig, 1905.)

D. R. PENARD'S enthusiastic and minute investigations into this group of the Protozoa are well known. In the course of many years' study of the Sarcodina of the Lake of Geneva and of the surrounding country, he became convinced that there is a special sarcodine fauna of deep lakes. The facts on which he founded his theory, already embodied in his

two great monographs of the Rhizopods and Heliozoa, are here presented in a form more accessible to the student. About fifty species and varieties are described and figured, the majority being peculiar to deep lakes, the others characteristic of, though not confined to, deep lakes.

On looking over the diagnoses of the species, it cannot fail to be remarked that many of them are distinguished by very trivial differences from other known species. Considering the intolerable burden of synonymy in zoological nomenclature which results from the practice of describing species on insufficient grounds, it is a pity that Dr. Penard should have conferred a specific name upon a form (*Diffugia curvicaulis*, Penard) which he naively admits he regards as scarcely even a fixed variety. Other instances are not wanting in the volume of species which seem to be of very little value. It is obvious that he makes insufficient allowance for the recognised variability of the species of the group. He puts too much reliance on size as a specific character, and gives an exaggerated value to minute differences in the size and form of the scales which encrust many species.

Making all allowance for the slight differences on which he separates the abyssal species from the related species of shallower waters, it appears that there is really some considerable amount of peculiarity among the abyssal Sarcodina. Species tend to appear in the abyssal region under different forms or varieties from those found elsewhere. We would ask, however, whether this peculiarity is any greater than one would expect from the influence which must be exerted by the very different environment upon the individuals produced in this region?

Of interest in this country is Dr. Penard's assertion that some representatives of the abyssal fauna of the Swiss lakes have been found by him in Loch Ness. The difficulty of accounting for the passage of abyssal forms from one lake to another is just touched upon, and dismissed with the short statement that several of the species have also been found at the margins of the lakes, as well as in the depths. One is tempted to make another explanation of this fact, and say that it proves that they are not peculiarly abyssal. Dr. Penard does not say whether he regards this coming to the shore as a normal mode of migration of abyssal species.

In the special case of Loch Ness, there are facts which make it difficult to believe that the abyssal Rhizopods are peculiar species. No abyssal species of any other class has yet been found in Loch Ness. Some of the forms which are regarded as purely abyssal in the Swiss lakes are found in the shallow bays of many Scottish lochs, and even in peat bogs. This may prove an interesting fact in distribution if it can be shown that species which are superficial in Scotland have to descend to some depth in Switzerland in order to find congenial conditions of temperature. Among Dr. Penard's abyssal forms which have been found in Scottish moss may be mentioned *Heliopera petricola*, var. *amethystea*, Penard, and *Cyphoderia ampulla*, var *major*, Penard.

Making due discount for his too high appreciation of minute differences, and appraising his species at

our own value, this volume is valuable to students of the Sarcodina, as there is no question of Dr. Penard's painstaking accuracy of observation. His descriptions are clear and concise, while the illustrations in the text are excellent.

STEAM TURBINES.

(1) *Steam Turbines, with an Appendix on Gas Turbines.* By Dr. A. Stodola, of Zurich. Translated from the second revised and enlarged German edition by Dr. L. C. Loewenstein. Pp. xvi+434; illustrated. (New York: D. Van Nostrand Company; London: Archibald Constable and Co., Ltd., 1905.) Price 21s. net.

(2) *Bau der Dampfturbinen.* By Prof. A. Musil. Pp. 6+233. (Leipzig: B. G. Teubner, 1904.) Price 8 marks.

(1) THE steam turbine has for some years now, thanks to the inventive genius of Mr. Parsons, become a formidable rival of the reciprocating steam-engine on land, and the past three years have seen a rapid increase in its use for marine purposes. On cross-channel steamers there is no doubt that in a few years it will completely oust its rival, while the adoption of this type of engine for two of the Allan line steamers, and the decision to use steam turbines for propelling the great Cunarders now being built, probably herald the approach of the day when on these big liners also the reciprocating marine engine will be entirely displaced.

It is not surprising, therefore, that there has grown up a rapid demand for good text-books on the steam turbine in which both the theory and the constructive details of the numerous types now on the market are fully dealt with. In addition to numerous papers and articles which have been printed in the Transactions of our leading engineering societies and in the technical journals, we have had two editions of Mr. Neilson's book, and now, by this English translation, the latest edition of Dr. Stodola's classic work is made available to British engineers.

In his preface to the second edition, Dr. Stodola points out that he has been able in the period which elapsed since the issue of the first edition to investigate experimentally several important problems untouched in the first edition, as, for example, the frictional resistance of turbine wheels in air. In the first section, after dealing with the elementary theory of the steam turbine, a concise and clear classification is given of the various types which have so far been practically successful. The more advanced thermodynamic problems which are met with in the theory of the steam turbine form the subject of the second section, and details are given of a series of valuable experiments on the flow of steam from orifices; these experiments are of great importance, and the results are very striking, and will undoubtedly prove of great value to those engaged in the design of diverging nozzles for turbines. In connection with this chapter, Mollier's diagrams for the properties of saturated steam are explained; these diagrams have been reproduced, and, for the English edition, similar